



PATENT ABSTRACTS OF JAPAN

(11) Publication number: **63114173 A**(43) Date of publication of application: **19.05.88**

(51) Int. Cl.

H01L 29/78(21) Application number: **61258557**(22) Date of filing: **31.10.86**(71) Applicant: **OKI ELECTRIC IND CO LTD**(72) Inventor: **IWABUCHI TOSHIYUKI
OCHIAI TOSHIYUKI****(54) SEMICONDUCTOR DEVICE AND MANUFACTURE THEREOF****(57) Abstract:**

PURPOSE: To prevent local electric field concentration in a drain region by providing a gate electrode surrounded by an insulating film formed on the bottom and side surfaces of a trench in a semiconductor substrate and an insulating wall formed on the substrate in the periphery of the trench, and source and drain regions formed in the substrate in approximately the same depth as the trench and in depth shallower than other sections in the vicinity of the trench.

CONSTITUTION: An oxide film 13 is formed on the side surface and base of a trench shaped, using a first insulating film and a side wall 12 as masks, a conductive film as a gate electrode is laminated from the surface and the conductive film is removed flatly through etching, and the gate electrode 14 surrounded by the side wall and said oxide film is formed. The first insulating film is removed, and impurity ions are implanted in approximately the same depth as the trench from the surface and source and drain regions 15 are shaped through heat treatment. Accordingly, since ions are implanted to the source-drain regions 15 from the outside of the side wall 12, diffusion layers in the

regions 15 are curved near the trench, and an electric field is not concentrated partially, thus acquiring high reliability.

COPYRIGHT: (C)1988,JPO&Japio

